

**National Exposure Research Laboratory
Research Abstract**

Government Performance Results Act (GPRA) Goal # 4
Annual Performance Measure # 258

Significant Research Findings:

Sampling Design to Assess National Change in Land Cover

Scientific Problem and Policy Issues	Land cover change is one of the most widespread and powerful environmental stressors in the United States. Creating national land cover maps is a challenging task that can take years to complete. This work attempted to estimate land cover change in a timely, cost-efficient manner using a sampling approach.
Research Approach	Analysis was performed by Omernik level III ecoregions. Within each ecoregion a number of 10 or 20 km ² blocks were randomly selected. The number of blocks was determined by the size of the ecoregion, with the goal of identifying 1% or greater change in land cover with an 85% confidence level. Each block was classified using a modified Anderson level I scheme for five time periods (approximately 1973, 1980, 1986, 1992 and 2000) using satellite imagery and ancillary data. Land cover change statistics for the ecoregion were calculated for each time period based on the change in the blocks. The research plan for this work was peer reviewed by three leaders in the field.
Results and Impact	Results have been completed for 18 ecoregions, including all of the Mid-Atlantic region. Percent and area of each land cover class and overall change in land cover is provided in an excel spreadsheet for each ecoregion by time period and for the entire study period (1973 - 2000). Information on the most common conversions (e.g. forest to urban) for each time step and the entire study period is also available in the spreadsheets. Information on broad changes in land cover may be useful to planners at the state and regional level as it may be used to measure conversion of natural cover to urban or agriculture uses which may affect habitat, air and water quality. The data are intended to be used by EPA program offices, EPA regions and states.
Research Collaboration and Research Products	<p>All work was performed by the US Geological Survey at the EROS Data Center, funded in part by IAG DW 14-9380108. Results, as well as imagery used in the process and other data are available on the Environmental Sciences Division/Landscape Ecology Branch website through http://www.epa.gov/nerlesd1/land-sci/trends/index.htm</p> <p>Published journal articles that describe the method or used the results:</p> <p>Griffith, J.A., Stehman, S.V., Sohl, T.L. and Loveland, T.R. 2003. Detecting trends in landscape pattern metrics over a 20-year period using a sampling-based monitoring programme. International Journal of Remote Sensing 24(1): 175-181.</p>

Griffith, J.A. Stehman, S.V., and Loveland, T.R. 2003. Landscape trends in Mid-Atlantic and Southeastern United States ecoregions. *Environmental Management* 32(5): 572-588.

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Loveland, T.R., Sohl, T.L., Stehman, S.V., Gallant, A.L., Sayler, K.L. and Napton, D.E. 2002. A strategy for estimating the rates of recent United States land-cover change. *Photogrammetric Engineering and Remote Sensing* 68(10): 1091-1099.

Stehman, S.V., Sohl, T.L. and Loveland, T.R. 2003. Statistical sampling to characterize recent United States land-cover change. *Remote Sensing of Environment* 86: 517-529.

Future Research

Classification and analysis of additional ecoregions is ongoing.

**Contacts for
Additional
Information**

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